

"It is, however, necessary to insure the supply of water in case of an accident to the conduit. This has been provided for to a certain extent by the emergency supply from the Lachine Canal, but that supply can only be resorted to for a short period.

"To insure it more completely, it will be necessary to be able to draw the water from the aqueduct canal and, therefore, to build a dam at the site of the old power house, so that the canal may be filled up in case of need.

"We think the best way to do this, would be to put in the foundations of the power house at a cost of \$400,000 and to proceed with the rest of the work as circumstances will allow.

"The cost on h.p. basis as mentioned in our previous report will be \$56.90 when the average consumption of water is 100 M.I.G. per day, but until such time it will not be necessary to have all the works completed and the annual expenditure will be less.

"It must be remarked, however, that when that average consumption becomes larger than 100 M.I.G. per day, the cost on h.p. basis will diminish to \$50.35 as mentioned in our previous report, and that the city will have an additional power of 11,500 h.p. at a cost of \$5.06 per h.p., or \$6.74 per e.h.p. during seven summer months.

"From the previous remarks we conclude:—

"1st.—The cost on h.p. basis for the buying of current (\$57.81) is larger than in the case of Scheme II. (\$56.90).

"2nd.—When the consumption of the water by the city is larger than 100 M.I.G. per day (probably in 10 years), the cost on h.p. basis for buying current will remain the same (\$57.81), whereas in the case of Scheme No. II. it will diminish (\$50.35).

"3rd.—During seven months of summer, Scheme No. II. will give the city 11,500 additional h.p. at a cost per e.h.p. of \$6.74 per annum, whereas it would have to pay \$15.46 for that same power to the contractor.

"4th.—In the case of purchased power, the boulevard scheme as proposed has to be abandoned. Though we cannot attach a tangible value to the boulevards, they certainly will be a benefit to the city.

"5th.—The immediate capital expenditure necessary in both cases will be about the same.

"We, therefore, recommend:—

"That the city proceed with the hydraulic development of the aqueduct as per Scheme No. II.;

"That the foundation of the power house be built as early as possible to insure the water supply of the city;

"That the balance of the work be proceeded with as circumstances will allow."

J. B. McRae's Report

J. B. McRae, of Ottawa, dissented from the views of Messrs. St. Laurent and Vautelet, and presented a minority report, copy of which has been secured by *The Canadian Engineer*, and which is as follows:—

"As stated in our Board's letter to you of the 18th inst., we have not been able to agree on a recommendation regarding the aqueduct schemes.

"The estimates show that the cost of operation is in favor of buying power, under the terms of the tender, made by the Civic Investment and Industrial Company. The figures for pumping at a rate of 100,000,000 Imperial gallons per day being:—

"Cost of operation—Scheme II. \$740,000

"Cost of buying power 606,991

"Difference in favor of buying power.. \$133,009

"This saving is per annum, and assuming present conditions of operation. Modern machinery and proper operation will reduce the cost of power considerably. Your attention is also drawn to the fact that it will be some years before the city requires the 100,000,000 Imperial gallons per day. In the meantime you pay for the power used to meet your requirements, which is much less proportionately for bought power than any of the power development schemes.

"I am informed that certain improvements are to be made at the reservoir and in the piping system. These improvements are for the purpose of cutting down the quantity of water pumped and reducing the friction head, against which the pumps are working. These improvements will favorably affect all the schemes, but it should be particularly noted that the reduction in cost of operation is greater in the case of bought power than in any of the other schemes.

Cost Per H.P. Not True Comparison

"The figures for the cost of operation have been used here for comparison and not the cost per horse-power. The horse-power basis should not be used, as it does not give a true comparison when comparing bought power with the other schemes.

"I would recommend that you enter into a contract with Civic Investment and Industrial Company for a quantity of power to meet your present requirements. The aqueduct should be put in such shape as will safely bring a supply of water, for domestic and fire purposes, to the pump house. Provision should also be made for the future development of such hydraulic power as may be developed economically. Such power, in combination with that purchased, will make the most economic power supply now possible, and should be sufficient for the city's requirements for, at least, the time of the power contract."

ST. AUGUSTINE-QUEBEC ROAD

Much of the preliminary and foundation work of the St. Augustine-Quebec road has been done and the contractor has just completed the erection of his asphalt mixing plant. The top surface will be asphaltic concrete of the "Improved Topeka" type. Work to date has been done under the direction of W. Gauvreau, C.E., formerly chief engineer of the Quebec Road Commission, and, since the turning over of the Quebec road to the province, engineer in charge for the Provincial Road Department. The chief engineer of the Provincial Road Department is Gabriel Henry.

Milton Hersey Company, Limited, of Montreal, have been retained by Messrs. Henry and Gauvreau as consulting, testing and inspecting engineers. The road is being constructed with Imperial asphalt. It is ten miles long, and is being built on an old macadam base.

The Corporation of Leicester, England, has prepared a town-planning scheme to be put into operation after the war.

The National Assembly of Panama has approved a contract made for the construction of a railway on the Atlantic Coast of Panama, starting from the mouth of the River Chagres and running south-west for at least 50 kiloms. to the city of Almirante. The concession is for seventy-five years, but the Government reserves the right to purchase the road after thirty years. The line has to be completed within five years.